Applied Research on ChatGPT-like AI Software in Scientific Journal Editing and Proofreading: A Case Study of Zhipu Qingyan (Postprint)

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Abstract

【Objective】The advent of ChatGPT has engendered profound impacts. Leveraging powerful artificial intelligence technology, it has transformed conventional work and lifestyles, heralding a new industrial revolution. This study employs Zhipu Qingyan as a case study to investigate the application of ChatGPT-like AI software in the editing and proofreading of scientific journals, aiming to provide editorial colleagues with a practical and operable tool that assists in review processes while exploring AI's potential in content creation.

【Methods】 Through flowchart illustrations, it details the functional applications and specific operational procedures of Zhipu Qingyan in editorial proofreading, encompassing unified proofreading, grammatical checking, spelling verification, punctuation inspection, etc. It further elaborates on typical applications of Zhipu Qingyan in editorial work, including article interpretation, proofreading, translation, and rewriting.

【Results】 Grounded in powerful database search engines and natural language processing technology, Zhipu Qingyan specializes in professional examination of academic literature, particularly Chinese language proofreading and English translation. By virtue of deep linguistic parsing and multi-turn dialogue modes, it enables editorial personnel to accomplish article interpretation and data analysis within minimal timeframes. Additionally, it offers diverse functionalities such as creative writing, patent drafting, code generation, real-time voice translation, and AI-powered image generation.

【Conclusion】 AI constitutes a double-edged sword in editorial work; it is imperative to cultivate and preserve the professional judgment and creative thinking of editorial staff, ensuring that efficiency gains do not compromise textual quality and accuracy, while strictly safeguarding information security. Through rational and standardized application of AI, it can serve as a powerful auxiliary tool

in editorial practice.

Full Text

Research on the Application of ChatGPT-like AI Software in Scientific Journal Editing and Proofreading: A Case Study of Zhipu Qingyan

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Abstract

The advent of ChatGPT has brought profound impacts, transforming traditional work and lifestyles with its powerful artificial intelligence technology and heralding a new industrial revolution. This paper examines the application of ChatGPT-like AI software in scientific journal editing and proofreading, using Zhipu Qingyan as a case study. The aim is to provide editorial colleagues with a practical and operable editing tool that not only assists in review and proofreading work but also explores the application of artificial intelligence in content creation. The study details the functional applications and specific operational procedures of Zhipu Qingyan in editorial work through flowcharts, including unified proofreading, grammar checking, spelling checking, and punctuation checking. It elaborates on typical applications of Zhipu Qingyan in editorial processes, such as article interpretation, proofreading, translation, and rewriting. Zhipu Qingyan leverages powerful database search engines and natural language processing technologies, focusing on professional checks of academic literature, particularly Chinese language proofreading and English translation. Through deep language analysis and multi-turn dialogue modes, it enables editorial staff to complete article interpretation and data analysis in minimal time. Additionally, it offers multiple functions including creative writing, patent drafting, code generation, real-time voice translation, and AI image generation. However, AI is a double-edged sword in editorial work. It is essential to cultivate and maintain editors' professional judgment and creative thinking to ensure that improved efficiency does not compromise text quality and accuracy, while strictly protecting information security. Through rational and standardized application of AI, it can become a powerful auxiliary tool for editorial work.

Keywords: ChatGPT; Zhipu Qingyan; artificial intelligence; scientific journals; editing and proofreading

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1. Research Background

Journal editors must process substantial amounts of textual material, including articles, reviews, and editorials, all requiring careful reading, proofreading, and editing. Additionally, journals typically operate on fixed publication cycles, requiring editors to complete article editing and proofreading within limited timeframes. Balancing high-quality publication with the demands of a new era represents a higher requirement and challenge for editorial professionalism. As a multilingual, big-data-driven artificial intelligence, ChatGPT (Chat Generative Pre-trained Transformer) is a natural language processing tool driven by AI technology newly launched by OpenAI [**?**]. It employs the Transformer neural network architecture, a model designed for processing sequential data, possessing language understanding and text generation capabilities. By connecting to extensive corpora for model training, it enables real-time interactive chat with humans [**?**]. Beyond this, it can perform tasks such as copywriting, translation, and code generation.

ChatGPT is a double-edged sword, demonstrating both positive and negative impacts in technological development, economic policy, and social transformation [**?**]. From the perspective of academic publishing, on one hand, ChatGPT-like AI software can help editorial staff improve efficiency in language translation, manuscript review, information retrieval, article proofreading, and academic sharing. On the other hand, accompanying risks such as plagiarism and retrieval errors pose certain ethical challenges in publishing [**?**]. Although AI has limitations in the editing and proofreading domain—for instance, it may not fully understand the deeper meaning of articles or may encounter difficulties when handling very new research fields or complex human social issues—it is undeniable that AI has indeed improved editors' work efficiency in automatic proofreading, rapid screening, language translation, and decision support. An increasing number of editors are gradually realizing that the cooperation between AI and editors will be a major trend in future journal editorial work [**?**].

With the rise of ChatGPT, domestic ChatGPT-like software has also developed rapidly, with continuously improving model quality and effectiveness, making them applicable in international scenarios. Developers are primarily internet companies and research institutions such as Baidu, JD.com, Tencent, and Zhipu AI (Table 1). These companies and research institutions possess rich experience and technical accumulation in model development, algorithm optimization, and exploration of application scenarios [**?**]. This paper uses Zhipu Qingyan as an example to provide a detailed introduction to the role and application modes of ChatGPT-like AI in scientific journal editing.

Table 1 Common Domestic ChatGPT-like AI Software

Developer (Product)	Website
Baidu (Wenxin Yiyan)	https://yiyan.baidu.com
Baichuan AI (Baichuan Model)	https://baichuan-ai.com
ByteDance (Yunque Model)	https://doubao.com
SenseTime (Riri Xin Model)	https://chat.sensetime.com
Zhipu AI (Zhipu Qingyan, GLM Model)	https://chatglm.cn
Chinese Academy of Sciences (Zidong Taichu Model)	https://xihe.mindspore.cn
Huazhi Model	https://huazhi.cnki.net/
Shanghai AI Laboratory (Shusheng General Model)	https://intern-ai.org.cn

2. Introduction to Zhipu Qingyan

Zhipu Qingyan is developed based on the GLM-3 language model jointly trained by Zhipu AI in 2023. It supports multi-turn dialogue and possesses capabilities in content creation and information summarization, representing a significant breakthrough in China's AI field. Its advantages lie in powerful language understanding and generation capabilities, enabling precise analysis of user queries. Furthermore, Zhipu Qingyan can self-learn and optimize based on user feedback to continuously improve service quality. Users can access its web-based online AI assistant or APP version to generate required information. Its main functions include multi-turn dialogue, creative writing, patent drafting, article interpretation, data analysis, code generation, real-time voice translation, and AI image generation.

2.1 Language Norms and Standards

The role of Zhipu Qingyan in editing and proofreading is based on a series of language norms and standards, including but not limited to linguistic standards, publishing standards, and internet language norms. For example, the *Law of the People's Republic of China on the Standard Spoken and Written Chinese Language* specifies standards for Chinese character writing, word usage, and grammatical structures. Publications such as *Specifications for Chinese Character Use in Publications* and *Punctuation Usage* ensure publication quality.

2.2 Unified Proofreading Function

Unified proofreading refers to maintaining consistent terminology, formatting, and style throughout a publication to ensure overall consistency and professionalism. This not only avoids low-level errors and inconsistent expressions, enhancing the professionalism and authority of publications, but also makes

them more neat and aesthetically pleasing, helping to maintain the journal's brand image and improve readers' reading experience. The unified proofreading function of Zhipu Qingyan is illustrated in Figure 1 [Figure 1: see original paper].

2.3 Similarities and Differences Between Zhipu Qingyan and Office Proofreading

Zhipu Qingyan and Microsoft Office (particularly Word) are different tools with certain similarities and differences in functionality, application scenarios, and operation methods (as shown in Figure 2 [Figure 2: see original paper]). Both can automatically detect grammatical and spelling errors in text and provide modification suggestions; both can help users check whether punctuation usage is correct; and both can help unify document formatting such as fonts, font sizes, and line spacing. However, differences exist between them, as shown in Table 2 .

Table 2 Differences Between Zhipu Qingyan and Microsoft Word Proofreading

Feature	Zhipu Qingyan	Microsoft Word
Depth and Breadth	Focuses on professional checks for specific proofreading needs, such as academic literature; focuses on Chinese language proofreading	Covers basic grammar, spelling, punctuation, and formatting; supports multiple languages
Updates and Maintenance	Requires regular updates to training data and algorithms to adapt to new language usage habits and norms	Proofreading functions continuously improve with software updates
Customization Capability	Provides more flexible customization	Allows some customization based on user preferences
AI and NLP Technology	Uses artificial intelligence and natural language processing technology	Uses preset rules and dictionaries

3. Applications in Editorial Work

3.1 Application in Article Interpretation

For journal editors, grasping the research topic and content of a paper is a crucial factor in determining whether to accept or reject an article. However, manual article interpretation has certain drawbacks compared to AI. Manual interpretation often includes personal viewpoints and biases, which may affect objective evaluation of article content; prolonged reading and interpretation

can lead to fatigue, increasing the risk of erroneous judgments; interpreters may be limited by their own knowledge levels and experience, making it difficult to fully understand or evaluate topics beyond their expertise; for non-native texts, manual interpretation may be affected by language proficiency, making it difficult to accurately understand the original intent and nuances; and compared with automated tools, manual interpretation is generally slower and less efficient, making it unsuitable for processing large volumes of text.

Zhipu Qingyan (GLM-3) provides a "long document interpretation" service, allowing users to upload a target document for questioning and summarization (as shown in Figure 3 [Figure 3: see original paper]). It can automatically generate article summaries and summary reports to help users quickly understand the main content and viewpoints of articles. It can also recommend relevant articles and interpretation content based on users' interests and needs. Additionally, it can continuously optimize its recommendation algorithm based on user feedback and behavior to improve recommendation accuracy and personalization. This automatic generation function can save users time and energy, improving reading efficiency.

3.2 Application in Article Proofreading

The three-review and three-proofreading system is a common quality control process in the publishing industry. For important articles or books, the publishing process requires review and proofreading by three different levels of editorial personnel to ensure quality meets publishing standards, reduce errors and omissions, and improve overall publication quality. Section 3.1 already introduced how AI meets the requirements for evaluating academic levels and expression consistency in the initial review, re-review, and final review stages. After articles pass the final review, they enter the proofreading stage. An article may require multiple readings and proofreading rounds, each focusing on different aspects—such as content in the first round, formatting in the second, and figures/tables in the third—requiring substantial time and effort.

The functions of Zhipu Qingyan based on language models in article proofreading are mainly reflected in the following aspects: grammar checking—automatically identifying grammatical errors including word collocations and sentence structures to help authors correct errors and make articles more fluent; spelling checking—detecting spelling errors including typos, missing characters, and redundant characters to improve accuracy; punctuation checking—verifying whether punctuation usage is standardized, including periods, commas, quotation marks, etc., to help authors revise non-standard usage and improve readability; style optimization—maintaining consistent article style according to authors' requirements, including word choice and sentence patterns, to make articles more professional; and writing suggestions—providing improvement suggestions based on article content and structure to help authors enhance their writing level (as shown in Figure 4 [Figure 4: see original paper]).

The specific steps for real-time proofreading using Zhipu Qingyan are as follows: First, integrate the Zhipu Qingyan API into your article editing tool or platform, which typically requires some development work such as integrating intelligent proofreading functions into text editors. API stands for Application Programming Interface, a set of predefined rules and protocols for building and interacting with interfaces between software applications. Simply put, an API acts like a waiter, allowing applications to exchange information and communicate according to certain standards and protocols. Second, upload the text content to the platform integrated with the Zhipu Qingyan API. Third, Zhipu Qingyan automatically analyzes the uploaded text, identifying potential grammatical errors, spelling errors, punctuation errors, etc. It typically highlights identified errors to facilitate quick discovery and correction by authors. For identified errors, Zhipu Qingyan usually provides modification suggestions, such as correct words, grammatical structures, or punctuation usage. Additionally, Zhipu Qingyan can analyze article structure, style, and word choice to provide optimization suggestions helping authors improve overall article quality. Authors can modify based on Zhipu Qingyan's feedback, then upload the text for another round of proofreading until the article quality meets expectations. Fourth, generate detailed proofreading reports including error types, error counts, and modification suggestions for summary and improvement.

It is important to note that although Zhipu Qingyan possesses powerful proofreading capabilities, it still relies on training data and models and may not cover all error types. Therefore, while depending on Zhipu Qingyan for proofreading, authors should maintain vigilance and conduct manual review for errors not identified by the system.

3.3 Application in Article Translation

For non-native articles, editorial personnel need to conduct bilingual review, simultaneously referencing original and translated texts to ensure translation accuracy and completeness. Typically, editors use professional translation quality control tools and techniques such as terminology databases and translation memory to translate individual words or passages. Some editorial offices also hire agencies for language polishing, substantially increasing translation time and economic costs.

Zhipu Qingyan provides efficient and intelligent translation functions, allowing users to select portions of text for polishing, streamlining, and expansion (as shown in Figure 5 [Figure 5: see original paper]). It supports online translation for Chinese, English, Japanese, Korean, French, and German languages. Zhipu Qingyan demonstrates significant advantages in article translation, offering users high-quality translation experiences through its powerful language understanding and generation capabilities. First, Zhipu Qingyan has massive corpus support, providing rich language resources and background knowledge for article translation. Second, during translation, Zhipu Qingyan fully considers contextual and semantic relationships. It performs not just simple word

or phrase replacement but analyzes sentence structure, grammatical rules, and semantic relationships to ensure translation accuracy and fluency. This deep translation capability enables Zhipu Qingyan to excel when handling complex sentence structures and long articles. Furthermore, Zhipu Qingyan possesses real-time translation and batch processing capabilities. Users can input articles for translation at any time, greatly improving translation efficiency. It also supports batch processing, allowing multiple articles to be translated simultaneously to meet large-scale translation needs.

3.4 Application in Article Rewriting and Expansion

In editorial work, when deeper exploration of a topic or provision of more background information is needed, articles may require expansion with additional details, data, or analysis. When article expression is unclear or lacks logical coherence, editors may need to rewrite articles for greater clarity and logical flow. Sometimes, to meet certain length requirements, reflect the latest information or trends, comply with specific legal or industry standards, or satisfy publication quality standards and brand voice, editorial personnel need to modify or expand articles. Achieving increased content depth while maintaining original intent and consistency, and balancing technicality with creativity, poses higher-level challenges for editors.

In academic writing, Zhipu Qingyan can help scholars improve writing efficiency, optimize paper structure, and enhance paper quality. Its specific operations and applications are shown in Figure 6 [Figure 6: see original paper], with functions mainly reflected in the following aspects: (1) Sentence rewriting—providing different expressions based on user-input sentences to meet writing requirements, making language more accurate and fluent, which is crucial for pursuing concise and clear expression in academic writing; (2) Content expansion—when users need to elaborate on certain viewpoints or arguments, Zhipu Qingyan can help expand content with more examples and analysis to enrich and deepen papers; (3) Structure optimization—providing structural suggestions based on user-provided outlines or partial content to help optimize paper structure for more rigorous and logical organization; (4) Plagiarism avoidance—helping users rewrite others' viewpoints and discussions to ensure originality and avoid plagiarism.

3.5 Literature Checking Function

As an AI assistant, Zhipu Qingyan's literature checking function is primarily implemented through natural language processing (NLP) technology and machine learning algorithms. First, Zhipu Qingyan needs to parse literature text to identify key information such as authors, titles, abstracts, keywords, introductions, methods, results, and discussions. Second, it analyzes literature content through algorithms to check for duplicate content, inconsistent viewpoints, errors, or misleading information. Finally, it verifies citation accuracy, including whether citation formats comply with norms and whether citations are missing or re-

dundant. In addition to these three core detection technologies, Zhipu Qingyan can perform other auxiliary checks including: consistency verification of terminology, abbreviations, numbers, and units in literature; checking whether formatting complies with specific academic or publishing standards; detecting plagiarism or duplicate publication by comparing literature content with known publications or other documents; identifying and correcting grammatical and spelling errors in literature; checking whether content of highly specialized literature complies with professional field standards and norms; and providing modification suggestions or decision support based on literature checking results to help authors or editors improve literature quality (as shown in Figure 7 [Figure 7: see original paper]).

It is worth noting that Zhipu Qingyan is an AI chatbot, and its literature retrieval function may not be as comprehensive as commonly used literature tools. Its literature retrieval function may not cover all disciplines and fields, whereas commonly used literature tools typically have more comprehensive literature databases. Furthermore, Zhipu Qingyan's literature retrieval function lacks advanced features such as batch downloading, literature management, and citation format conversion, and only supports Chinese or English, while commonly used literature tools support retrieval functions in multiple languages.

4. Considerations for Using Zhipu Qingyan in Editing and Proofreading

When using Zhipu Qingyan or other AI tools in editing and proofreading, it is essential to combine them with manual review to ensure final output is both accurate and consistent with original intent and style. This is because although AI can assist in checking grammatical and spelling errors, it may not fully understand complex contexts and subtle linguistic differences. On one hand, AI tools lack sensitivity to specific cultures or regions, so extra caution should be exercised in cross-cultural editing to ensure content appropriateness. On the other hand, the performance of AI proofreading tools depends on the quality and timeliness of their training data. Users should pay attention to when the tool was trained and whether it is regularly updated to adapt to new language norms and editing requirements. Users can also provide feedback to developers to help improve AI proofreading tool performance and user experience.

This paper explores the application of AI-based software like Zhipu Qingyan in scientific journal editing and proofreading. As an AI assistant, Zhipu Qingyan possesses powerful language understanding and generation capabilities, enabling article interpretation, grammar checking, spelling checking, punctuation checking, style optimization, and writing suggestions. It also supports article translation, expansion, rewriting, and literature checking functions. Zhipu Qingyan significantly improves editorial efficiency, but requires combined manual review to ensure accuracy and stylistic consistency. This paper emphasizes that while AI technology brings convenience to editorial work, its limitations and the timeliness of training data must be recognized, while user feedback should be pro-

vided to help improve AI systems. Overall, the application of AI tools like Zhipu Qingyan represents the future trend of journal editorial work, but requires cautious use in combination with manual review to ensure high-quality publication.

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Note: Figure translations are in progress. See original paper for figures.